

431.01	Introduction
431.02	Applicable Statutes and Regulations
431.03	Policy Guidance
431.04	Interagency Agreements
431.05	Technical Guidance
431.06	Permits and Approvals
431.07	Non-Road Project Requirements
431.08	Exhibits

Key to Icons



Web site.*



Interagency agreement.

431.01 Introduction

This chapter includes information and requirements for water quality, surface water, stormwater runoff, fill material in wetlands, and construction erosion control and runoff. It focuses mainly on road projects. Policies, procedures, and permit requirements specific to ferries, airports, rail, and non-motorized transport are addressed in [Section 431.07](#). For other water-related issues, see [Chapter 432](#) (Floodplain), [Chapter 433](#) (Groundwater), [Chapter 437](#) (Wetlands), [Chapter 452](#) (Coastal Areas and Shorelines), and [Chapter 453](#) (Wild and Scenic Rivers).

(1) **Summary of Requirements**

Water quality and other surface water issues that must be addressed during development of WSDOT projects include work in water, shorelines, floodplains, and other critical areas as well as stormwater discharges, interference with stream flows, use of herbicides, and water rights.

WSDOT's Water Quality Discipline Report checklist provides the basis for identifying these issues and available sources of information. Other references, documents, Interagency Agreements, permits, certificates, and approvals included in this section provide background relevant to the WSDOT discipline reports for water quality.

Water quality standards are implemented through Clean Water Act (CWA) Section 401 certifications, water quality modifications, and compliance with the standards in RCW 90.48 and WAC 173-201A. Applications for water quality related permits include the Joint Aquatic Resources Permit Application (JARPA) process, and the National Pollutant Discharge Elimination System (NPDES) permits. Water-related permits, certificates, and approvals are listed in [Section 431.06](#). Details are in [Chapter 520](#) through [Chapter 550](#). See also [Sections 432.06, 433.06, 436.06, and 437.06](#).

* Web sites and navigation referenced in this chapter are subject to change. For the most current links, please refer to the online version of the EPM, available through the ESO home page: <http://www.wsdot.wa.gov/environment/>

The listing of salmonids under the Endangered Species Act (ESA) has triggered the development of new requirements for water quality issues. Planning processes under the ESA, CWA, and national and state environmental policy acts (NEPA/SEPA) are becoming increasingly integrated. As a result, regulations related to threatened and endangered salmonids are in the process of being incorporated into permits related to the CWA. In turn, WSDOT is incorporating ESA-related issues into its water quality procedures and design standards.

(2) Abbreviations and Acronyms

Abbreviations and acronyms used in this chapter are listed below. Others are found in the general list in [Appendix A](#).

401 Certification	Clean Water Act Section 401, Water Quality Certification
AKART	All known, available, and reasonable methods of prevention, control, and treatment
BMP	Best Management Practice
Corps	U.S. Army Corps of Engineers
CTED	Department of Community, Trade, and Economic Development
CWA	Clean Water Act
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
EAP	Environmental Assessment Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GHPA	General Hydraulic Project Approval
HPA	Hydraulic Project Approval
JARPA	Joint Aquatic Resources Permit Application
LOP	Letter of Permission
MHHW	Mean Higher High Water
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permit
OHWM	Ordinary High Water Mark or line
SMA	Shoreline Management Act
SWDP	State Waste Discharge Permit
STMs	Short-Term Water Quality Modifications
TESC	Temporary Erosion and Sediment Control
TMDL	Total Maximum Daily Load
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington State Department of Fish and Wildlife
WSF	Washington State Ferries
WRIA	Water Resource Inventory Area

(3) **Glossary**

See [Appendix B](#) for a general glossary of terms used in the EPM.

Contaminant – Any physical, chemical, biological, or radiological substance or matter that has an adverse affect on air, water, or soil.

Herbicide – A chemical designed to control or destroy plants, weeds, or grasses.

Pollutant – Any substance of such character and in such quantities that upon reaching the environment (soil, water, or air), is degrading in effect so as to impair the environment's usefulness or render it offensive.

Surface Runoff – Overland flow of water.

Stormwater – Rainwater that flows over land and into natural and artificial drainage systems. Stormwater runoff is a major transporter of nonpoint source pollutants.

Surface Water – All water naturally open to the atmosphere, such as rivers, lakes, reservoirs, ponds, streams, seas, and estuaries.

Suspended Sediment – Fine material or soil particles that remain suspended by the current until deposited in areas of weaker current. Can be measured in a laboratory as “Total Suspended Solids” (TSS).

Turbidity – A condition in water caused by the presence of suspended material resulting in scattering and absorption of light rays.

Wastewater – Literally, water that has been used for some purpose and discarded, or wasted; typically liquid discharged from domestic residential, business, and industrial sources that contains a variety of wastes.

Watershed – The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point.

431.02 Applicable Statutes and Regulations

This section lists the primary statutes and regulations applicable to water quality issues. See [Appendix D](#) for an index of major statutes and regulations referenced in the EPM. Permits and approvals required pursuant to these statutes are listed in [Section 431.06](#).

(1) **Federal**

(a) **National Environmental Policy Act**

The National Environmental Policy Act (NEPA), 42 USC Section 4321, requires that all major actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that environmental considerations such as impacts on water quality are given due weight in decision-making. Federal implementing regulations are at 23 CFR 771 (FHWA) and 40 CFR 1500-1508 (CEQ). For details on NEPA procedures, see Chapter 410 and Chapter 411.

(b) Clean Water Act

The Water Pollution Control Act, better known as the Clean Water Act (CWA), 33 USC 1251 *et seq.*, provides for comprehensive federal regulation of all sources of water pollution. It prohibits the discharge of pollutants from non-permitted sources. The CWA authorizes the USEPA to administer or delegate water quality regulations covered under the act. In Washington, authority is delegated primarily to Corps and Ecology. USEPA administers CWA implementation on tribal and federal land.

Implementation requirements for CWA Sections 303(d), 305(b), 401, 402, and 404 are described in **Section 431.06**. The law is online at:

 <http://www4.law.cornell.edu/uscode/>

Click on Title 33, then Chapter 26.

Or by direct link:

 <http://www4.law.cornell.edu/uscode/33/ch26.html>

(c) Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, 16 USC 1451 *et seq.*, (regulations in 15 CFR 923-930), was enacted to encourage advancement of national coastal management objectives and help states develop and implement management programs. Washington's Coastal Zone Management Program has been approved by the National Oceanic and Atmospheric Administration and is administered by Ecology. Under the program, cities and counties can develop local management plans that must be approved by Ecology. Ecology also provides general program overview and support. For details see **Section 452.02**. The law is online at:

 <http://www4.law.cornell.edu/uscode/>

Click on Title 16, Chapter 33.

Or by direct link:

 <http://www4.law.cornell.edu/uscode/16/ch33.html>

(d) Endangered Species Act (ESA)

This act is administered by USFWS and NOAA Fisheries. Formal consultation under the act is triggered by a federal nexus including permits, funding or actions on federal land, and by the potential harm, harassment, or take of listed species or impacts to their habitat. Informal consultation under Section 10 of the act requires applicants to comply with the ESA even if a federal nexus does not occur. The ESA has relevance to water quality because of listed aquatic species. Please see **Section 436.02** for more details. The law is online at:

 <http://www4.law.cornell.edu/uscode/>

Click on Title 16, then Chapter 35.

Or by direct link:

 <http://www4.law.cornell.edu/uscode/16/ch35.html>

USFWS home page:

 <http://www.fws.gov/>

NOAA Fisheries home page:

 <http://www.nmfs.noaa.gov/>

(2) State

(a) State Environmental Policy Act

The State Environmental Policy Act (SEPA), requires that all major actions sponsored, funded, permitted, or approved by state and/or local agencies undergo planning to ensure environmental considerations such as impacts on water quality are given due weight in decision-making. State implementing regulations are in WAC 197-11 and WAC 468-12 (WSDOT). For details on SEPA procedures, see **Chapter 410 and Chapter 411.**

(b) State Water Quality Laws and Rules

Water quality regulations are mandated by the federal Clean Water Act (CWA). The Water Pollution Control Act (RCW 90.48) is the primary water pollution law for Washington state. Under state statute, discharge of pollutants into waters of the state, is prohibited unless authorized. WAC 173-201A mandates water quality standards for surface waters. All wastes must be provided with all known, available, and reasonable methods of prevention, control, and treatment (AKART) prior to discharge into the state's waters.

To promote compliance with water quality standards, Ecology issues CWA Section 401 certificates of water quality compliance for each project requiring a CWA Section 404 permit, administrative orders for projects not requiring Section 404 permits, National Pollutant Discharge Elimination System (NPDES) individual and general permits, and State Waste Discharge Permits (SWDPs).

The Water Pollution Control Act and state water quality standards are online at:

 <http://www.ecy.wa.gov/>

Click on Laws and Rules, then Index of Laws (RCW) or Index of Rules (WAC), and look under Water Quality.

Or by direct link for RCW 90.48:

 <http://www.leg.wa.gov/RCW/index.cfm?fuseaction=chapterdigest&chapter=90.48>

Or by direct link for WAC 173-201A:

 <http://www.leg.wa.gov/wac/index.cfm?fuseaction=chapterdigest&chapter=173-201A>

(c) Shoreline Management Act (SMA)

The goal of Washington's Shoreline Management Act (RCW 90.58) is "to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines." The Act establishes a broad policy of shoreline protection, which includes water quality.

The SMA uses a combination of policies, comprehensive planning, and zoning to create a special zoning code overlay for shorelines. Under the SMA, each city and


county can adopt a shoreline master program that is based on state guidelines but tailored to the specific geographic, economic, and environmental needs of the community. Master programs provide policies and regulations addressing shoreline use and protection as well as a permit system for administering the program.

Please refer to **Chapter 452** and **Section 550.02** for more details about the SMA, local Shoreline Master Programs, and Shoreline Substantial Development Permits. The statute is online at:

 <http://slc.leg.wa.gov/>

Click on RCW, then Title 90, then 90.58, Shoreline Management Act. The state guidelines for Shoreline Master Programs can be found at Chapter 173-26 WAC.

Or by direct link for RCW 90.58:

 <http://www.leg.wa.gov/rcw/index.cfm?fuseaction=chapterdigest&chapter=90.58>

Or by direct link for WAC 173-26:

 <http://www.leg.wa.gov/wac/index.cfm?fuseaction=chapterdigest&chapter=173-26>

(d) Coastal Zone Management Act Certification (CZM)

Ecology includes a CZM consistency response with the CWA Section 401 certification for any work in the 15 coastal counties. For detail, please see **Section 540.02** and **Section 540.03**.

(e) Watershed Planning Law

The watershed planning law (RCW 90.82) is intended to provide more specific guidance on cooperative methods of determining the current water resource situation in each water resource inventory area of the state. It serves to provide local citizens with the maximum possible input concerning goals and objectives for water resource management and development. The law is on-line at:

 <http://slc.leg.wa.gov/>

Click on RCW, then Title 90, then 90.82, Watershed Planning.

Or by direct link:

 <http://www.leg.wa.gov/rcw/index.cfm?fuseaction=chapterdigest&chapter=90.82>

431.03 Policy Guidance

(1) Washington State Transportation Commission

The Transportation Commission's Policy Catalog states that WSDOT will "minimize the impact that construction, operation and maintenance of transportation facilities has on the state's surface and groundwater" and specifically "to minimize and control levels of harmful pollutants generated by transportation activities from entering surface and groundwater resources."

(2) **Other Policy Guidance**

For other policies related to wetlands, please see [Section 437.03](#).

431.04 Interagency Agreements

(1) **Implementing Agreement – Water Quality Standards (1998) – being revised**

The February 1998 Implementing Agreement between Ecology and WSDOT regarding compliance with state surface water quality standards, currently being revised, is intended for use by WSDOT and WSDOT contractors. The agreement covers general conditions, concrete work, erosion control, hazardous spill prevention and control, spill reporting, and activity-specific provisions to help ensure compliance with state water quality standards for erosion control in new roadway and bridge construction projects.

The 1998 Water Quality Implementing Agreement replaced the 1997 WSDOT General Short-Term Water Quality Modification and the 1988 MOA with Ecology. Both agencies expect that implementation of this agreement will result in compliance with the state's Water Quality Standards (WAC 173-201A). Ecology is notified of projects through submittal of a JARPA application if applicable, or through telephone/e-mail contact for:

- All new construction projects requiring a CWA Section 401 Water Quality Certification.
- Projects that are large, contentious, or involve a significant amount of work in the water.
- Any project that does not comply with conditions listed in the agreement.


Water quality standards are implemented and maintained by the JARPA process, NPDES permits, WSDOT's 2004 *Highway Runoff Manual*, and appropriate BMPs.

This 1998 implementing agreement does not allow for a modification of water quality standards. However, short-term water quality modifications might still occasionally be issued by Ecology's Federal Permits Unit for in-stream work where implementation of all available BMPs may not be enough to ensure conformance with state water quality standards (see [Section 540.25](#), Other State Approvals – Temporary Exceedance of Water Quality Standards). Monitoring and testing of water quality is required during construction.

When the agreement supersedes the need for a Hydraulic Project Approval (HPA) permit, it is courteous for WSDOT to inform WDFW of work performed in waterways (see the MOU on work in water courses, described below).

The agreement is online at the WSDOT's ESO Compliance Branch web site or by direct link:

 <http://www.wsdot.wa.gov/environment/Programmatics/docs/impagfin.pdf>

 Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation Regarding Compliance with the State of Washington Surface Water Quality Standards, February 13, 1998.

- (2) ***Compliance Implementing Agreement – Water Quality Standards (2004)***
The November 2004 Compliance Implementing Agreement between WSDOT and Ecology is designed to assist in obtaining and maintaining WSDOT compliance with state water quality standards, including compliance with Section 401 Certifications, Section 402 NPDES permits, and other Ecology Orders and approvals. It defines the elements needed to increase compliance for WSDOT and WSDOT contractors. For details, see [Section 610.03](#).
- (3) ***Signature Agency Committee Agreement to Integrate Aquatic Permit Requirements into NEPA/SEPA Process***
The Signatory Agency Committee (SAC) Agreement applies to all WSDOT projects requiring a Corps of Engineers (Corps) Individual Section 404 or Section 10 permit and FHWA action on a NEPA EIS. Signatories are FHWA, NOAA Fisheries, Corps, USEPA, USFWS, Ecology, WDFW, and WSDOT. These agencies aim to integrate conditions of aquatic related permits and approvals, with the NEPA/SEPA processes at the planning, programming and project development stages. The SAC process involves requests for resource agency “concurrence” at critical point in the NEPA process. For details, see [Section 411.06](#).
- (4) ***Alternative Mitigation Policy Guidance Interagency Implementation Agreement***
The purpose of this February 2000 agreement between WDFW, Ecology, and WSDOT is to describe consensus on mitigation policy among the agencies responsible for aquatic resource mitigation. See [Section 437.04](#) for details.
- (5) ***Memorandum of Agreement between WDFW and WSDOT - Construction of Projects in State Waters***
This June 2002 MOA between WSDOT and WDFW, is designed to provide a mutual understanding between the agencies for application and acquisition of Hydraulic Project Approvals, and establishes procedures to comply with the Hydraulic Code Rules (WAC 220-110). Revisions to this agreement are to be completed by December 2005. See [Section 436.04](#) for details.
- (6) ***Other Interagency Agreements***
For other agreements related to water resources please see [Section 436.04](#) (fish and wildlife) and [Section 437.04](#) (wetlands). See [Appendix E](#) for a complete index to interagency agreements referenced in the EPM and a summary of provisions related to each phase of the WSDOT Transportation Decision-making Process.

431.05 Technical Guidance

- (1) ***Water Quality Discipline Report***
The purpose of the Water Quality Discipline Report is to provide information required for EAs, EISs, and a variety of water quality permits, certificates, and approvals. Discipline studies characterize water quality in a watershed context that includes surface water, groundwater, wellhead protection areas, source water protection areas, soils and topographic features affecting basin hydrology, existing water quality conditions, and land use patterns affecting runoff

conditions. Unique aspects of individual permits are called out under the discussion of permits.

(a) Determining the Necessary Level of Effort

It is important to properly determine whether or not a discipline study is necessary and the appropriate level of detail to include in discipline studies.

A Water Quality Discipline Report is needed when a proposed project could have a significant impact to receiving waters by:

- Increasing the amount of pollutants discharged to receiving waters
- Increasing peak runoff flows to receiving waters
- Involving construction within water bodies, their buffers or floodplains.

The Water Quality Discipline Report may also be necessary in cases where build options reduce the amount of pollutants or peak flows but there are significant differences in the benefits between the alternatives.

A Water Quality Discipline Report is not needed if the project does not have the potential to significantly impact receiving waters. Generally, this is true for projects that do not:

- Increase the acreage of impervious surfaces
- Increase traffic capacity
- Present a significant risk of eroded sediments or spilled pollutants from entering receiving waters
- Involve work in water bodies, their buffers or floodplains

If a Discipline Report is not needed, document the rationale in a technical memo and add to the project file.

If it is not clear whether significant water quality impacts are likely, a preliminary investigation should be performed using the guidance for preparing discipline studies outlined below. If at any point, it becomes apparent that there will be no significant impacts or differences among the alternatives, the investigation can be terminated. The rationale for determining that a full Discipline Report is not needed should be documented in a technical memo and added to the project file.

(b) Preparing the Discipline Report

[Exhibit 431-1](#) through [Exhibit 431-4](#) constitute WSDOT's guidance for preparing water quality discipline studies. The Water Quality Discipline Report Checklist ([Exhibit 431-1](#)) helps ensure that all project-related water issues are adequately considered. The Surface Water Quality Discipline Study Guidance document ([Exhibit 431-2](#)) provides detailed instructions on how to write Water Quality Discipline Studies. The Information Source Listing for WSDOT Water Quality Discipline Reports ([Exhibit 431-3](#)) is an additional resource to help report writers more quickly identify information sources. The Quantitative Procedures for Water Quality Impact Assessments ([Exhibit 431-4](#)) describes the methodology for estimating water quality impacts based on WSDOT highway runoff data.

(2) **Other WSDOT Guidance and Technical Resources**

(a) **WSDOT Highway Runoff Manual**

The *Highway Runoff Manual* (M 31-16, March 2004) summarizes the stormwater management requirements and describes approved methods of managing stormwater runoff known as Best Management Practices (BMPs). The *Highway Runoff Manual* contains sections on stormwater planning, BMP selection, design, and computational standards, economic and engineering feasibility, temporary erosion and sediment control planning, spill prevention control and countermeasures planning and water quality monitoring. The NPDES Construction Stormwater General Permit that was issued in November 2005 includes water quality monitoring requirements. Chapter 6 of the Highway Runoff Manual will be updated by the Spring of 2006 to reflect the new requirements.

The Washington State Department of Ecology conditionally approved the 2004 *Highway Runoff Manual* as equivalent to its Stormwater Management Manuals for Western and Eastern Washington (SMMWW and SMMEW) for compliance with Ecology permits (40 CFR 402; WAC 173-270). Permit conditions are attached to the manual.

The manual and associated updates can be accessed online at:

 <http://www.wsdot.wa.gov/>

Click on Environmental, then 2004 Highway Runoff Manual under Current Events.

Or by direct link:

 <http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/HighwayRunoff2004.pdf>

(b) **WSDOT GIS Workbench**

Useful information may be obtained from the WSDOT GIS Workbench, a GIS interface for internal WSDOT users only. It has numerous layers of environmental and natural resource management data. WSDOT works with federal, state, and local agencies to maintain a collection of the best available data for statewide environmental analysis. Available databases relevant to water quality include water resource inventory areas (WRIAs) and sub-basins, major shorelines, CWA Section 303(d) Impaired Waters, NPDES permit areas and sites, and stormwater outfalls on State Routes. For information on how to access the GIS Workbench, see:

 <http://www.wsdot.wa.gov/environment/envinfo/default.htm>

For a list of current data sets, see WSDOT's web site:

 <http://www.wsdot.wa.gov/>

Click on Maps & Data, then GIS Data Distribution Catalog.

Or by direct link:

 <http://www.wsdot.wa.gov/mapsdata/geodatacatalog/default.htm>

(3) **FHWA Guidance**

(a) **FHWA Technical Advisory**

FHWA Technical Advisory T 6640.8A (October 1987) gives guidelines for preparing environmental documents. For water quality, an EIS should identify roadway runoff or other nonpoint source pollution that may have an adverse impact on sensitive water resources such as water supply reservoirs, groundwater recharge areas, and high quality streams. The Water Quality Discipline Report is intended to meet the requirements of the FHWA Technical Advisory. For details, see FHWA's web site:

 <http://www.fhwa.dot.gov/>

Click on Legislation and Regulations, then FHWA Directives and Policy Memorandums, then FHWA Technical Advisories, then T6640.8A.

Or by direct link:

 <http://www.fhwa.dot.gov/legsregs/directives/techadv/t664008a.htm>

(b) **FHWA Watersheds, Water Quality, and Stormwater Runoff**

Abstracts of documents produced by or for the FHWA regarding water quality, stormwater runoff, and watersheds are available online. These include the *National Highway Runoff Water-Quality Data and Methodology Synthesis*, USEPA's site on the Clean Water Initiative, basic definition of watershed and watershed management, USEPA's Surf Your Watershed, and FHWA documents, brochures, and other products.

 <http://www.fhwa.dot.gov/>

Click on FHWA Programs, then Environment, then Natural Environment, then Water Quality and Stormwater Runoff, or also Watersheds.

Or by direct link for Water Quality:

 <http://www.fhwa.dot.gov/environment/h2o.htm>

Or by direct link for Watersheds:

 http://www.fhwa.dot.gov/environment/h2o_shed.htm

(c) **FHWA Environmental Guidebook**

FHWA online Environmental Guidebook contains several guidance documents and federal MOAs on topics related to water quality, the Clean Water Act, and coastal zone management.

Available via FHWA's web site:

 <http://www.fhwa.dot.gov/>

Click on FHWA Programs, then Environment, then Environmental Guidebook

Or by direct link:

 <http://environment.fhwa.dot.gov/guidebook/index.htm>

(4) Ecology Guidance

(a) Water Quality Program Policy and Procedures

These water quality rules are pursuant to WAC 173-201A-400, which eliminates the need for short-term water quality modifications (STMs). The revisions require the use of BMPs to meet water quality standards. See Ecology *Water Quality Program Policy 1-19 and Procedure 1-20*, August 1998.

(b) Impaired and Threatened 303(d) Waterbodies

Washington State is required by the CWA Section 303(d) (40 CFR 130.7) to identify its polluted water bodies every two years and submit the 303(d) list to USEPA. The list is comprised of “water quality limited” estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next two years. USEPA requires the state to set priorities for cleaning up threatened waters and to establish a Total Maximum Daily Load (TMDL) for each. A TMDL, or water cleanup plan, entails an analysis of pollutant loadings to determine how much pollution a waterbody can take and still remain healthy for its intended beneficial uses. The cleanup plan also includes recommendations for controlling the pollution and a monitoring plan to verify compliance with established TMDLs. For certain waterbodies, TMDLs have been set; for others, TMDLs are being developed by Ecology.

Once developed, the TMDLs are tied to Corps Section 404 and 401 water quality permit requirements.

Ecology’s web site provides access to a list of approximately 650 waterbodies currently identified as impaired or threatened. The list identifies the locations of the waterbodies, the water quality standards each exceeds, and by how much the standards are exceeded.

Washington’s Final 2002/2004 Section 303(d) list of Impaired and Threatened Waterbodies is online via:

 <http://www.ecy.wa.gov/>

Click on Programs, then Water Quality, Data Sources, then Washington State’s Water Quality Assessment [Section 303(d) List] Surface Waters Information, then Section 303(d) List.

Or by direct link:

 <http://www.ecy.wa.gov/programs/wq/303d/index.html>

Internal WSDOT users can view 303(d) listed water bodies at:

GISOSC\GEODATA\maps\100K\DOE\303D\

(c) Water Quality 305(b) Assessment

Washington State is required by the CWA Section 305(b) to prepare a water quality assessment report every five years and submit it to USEPA. In addition, USEPA requires the state to submit certain assessment data annually for compilation in a national report. The requirements are administered by Ecology.

For access to the data and a description of requirements for ecoregions, stream/river basins, estuaries, and lakes, refer to the Washington State Water Quality Assessment Section 305(b) reports on Ecology’s web site:

 <http://www.ecy.wa.gov/>

Click on Programs, then Water Quality, then Water Quality Assessments, then 305(b) Report Information

Or by direct link:

 http://www.ecy.wa.gov/programs/wq/303d/305b_report/305b-index.html

(d) Watershed Basin Reports and Action Plans (Local or Inter-Jurisdictional Plans)

Many watershed and basin plans include specific recommended action items on priority environmental issues such as fixing or repairing fish passage barriers. The Water Quality Discipline Report should address the guidance outlined in watershed/basin action plans.

Some plans are listed under Ecology's Watershed Planning web site below; others are available from local jurisdictions.

 <http://www.ecy.wa.gov/>

Click on Programs, Water Quality, Watersheds, then Watershed Planning

Or by direct link:

 <http://www.ecy.wa.gov/watershed/index.html>

(5) U.S. Army Corps of Engineers Water Protection Guidance

The Corps of Engineers (Corps) regulatory program concerns not only the integrity of traditional navigable waters, but also the quality of waters of the United States, from wetlands to the territorial seas. Corps regulatory procedures are online at the Corps Seattle District web site:

 <http://www.nws.usace.army.mil/index.cfm>

Click on Regulatory/Permits. Also click on Environmental Resources Section.

Or by direct links:

 http://www.nws.usace.army.mil/publicmenu/menu.cfm?sitename=reg&pagename=home_page

Or:

 <http://www.nws.usace.army.mil/ers/index.html>

431.06 Permits and Approvals

Each water quality permit or approval listed in this section should be considered for relevance during design and environmental review. See previous sections in this chapter for policies and other guidance related to these permits. See [Appendix F](#) for a complete summary of permits and approvals that may be applicable to WSDOT projects.

WSDOT's Water Quality Discipline Report should provide the information needed to satisfy most permit requirements. If WSDOT is in compliance with water quality permits, then it is presumed to be in compliance with water quality standards.

Permits relating to Water Quality are addressed in the following sections:

Federal

- Section 520.02 – Section 404 Permit

Tribal

- Section 530.03 – Tribal consultation or approval required under federal statutes: Clean Water Act Section 401 (Chehalis and Puyallup)

State

- Section 540.02 – Section 401 Water Quality Certification
- Section 540.03 – Coastal Zone Management Consistency Certification
- Section 540.04 – NPDES Construction Stormwater Permit
- Section 540.05 – NPDES Municipal Stormwater Permit
- Section 540.06 – NPDES Sand and Gravel Permit
- Section 540.07 – NPDES Industrial Stormwater Permit
- Section 540.08 – Other NPDES Programmatic Permits
- Section 540.13 – Isolated Wetlands Administrative Order
- Section 540.15 – Hydraulic Project Approval
- Section 540.16 – Aquatic Lands Use Authorization
- Section 540.21 – On-site Sewage Facility Permit
- Section 540.25 – Other State Approvals (Temporary Exceedance of Water Quality Standards)
- Section 540.25 – Other State Approvals (Dam Construction Permit, Reservoir Permit)

Local

- Section 550.02 – Shoreline Management Permits
- Section 550.03 – Floodplain Development Permit
- Section 550.04 – Critical Areas Ordinance Approval

431.07 Non-Road Project Requirements

(1) Ferries

Surface water treatment for portions of WSF terminals is often difficult because of the confined areas, and because most of the docks slope toward the water.

(a) Interagency Agreement


The 1998 Water Quality Implementing Agreement between Ecology and WSDOT regarding compliance with Washington surface water quality standards, currently being revised, includes activity-specific conditions that apply to the ferry system. Such activities include ferry terminal transfer span cleaning and painting activities, and work on existing ferry structures. The agreement is described in **Section 431.04** and can be located online at:

 <http://www.wsdot.wa.gov/environment/>

Click on Regulatory Compliance, then Water Quality Implementing Agreement (under Environmental Documents).

Or by direct link:

 <http://www.wsdot.wa.gov/environment/Programmatics/docs/impagfin.pdf>

 Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation Regarding Compliance with the State of Washington Surface Water Quality Standards, February 13, 1998.

(b) General Permit Requirements

The ferry system is subject to the same permits as the road system for upland and aquatic projects. The most commonly required road project permits that are also required for ferry projects are Corps of Engineers Section 10 or Section 404 permits, (including NWPs and Letters of Permission), USCG Section 9, HPA, and shoreline permits. These permits are typically obtained through the JARPA process. WDFW regulates areas below OHWM in salt water. A few WSF terminals and other facilities have NPDES general permits. Please see [Section 540.04](#) through [Section 540.08](#) for more details about these permits.

In order to comply with these permit requirements, it is important to know the accurate distance from the shoreline to the project. For marine water the shoreline is measured from the mean higher high water (MHHW) and for freshwater it is measured from the ordinary high water mark (OHWM) or line.

(c) NPDES Stormwater Industrial Permit

This permit for stormwater discharges associated with industrial activities is required for WSDOT ferry facilities that provide fueled vehicles to remove stalled vehicles from docks. See [Section 540.07](#) for details.

Development of a Stormwater Pollution Prevention Plan (SWPPP) that identifies BMPs to prevent surface water and groundwater pollution is the most significant permit requirement. WSDOT's 2004 *Highway Runoff Manual* (M31-16) is the primary document used for selection of BMPs.

(2) Airports, Rail, and Non-Motor

Airport, rail, and non-motorized projects are generally subject to the same water quality policies, procedures, and permits as for road projects.

In rail projects, railroad fills, including ties, rails, and structures over streams are considered impervious. To prevent materials falling off trains into waterbodies, enclosed structures must be used to transport materials.

431.08 Exhibits

[Exhibit 431-1 – Water Quality Discipline Report Checklist.](#)

[Exhibit 431-2 – Surface Water Quality Discipline Report Technical Guidance.](#)

[Exhibit 431-3 – Information Source Listing for WSDOT Water Quality Discipline Reports.](#)

[Exhibit 431-4 – Quantitative Procedures for Water Quality Impact Assessments.](#)

Water Quality Discipline Report Checklist

Project Name: _____ Job Number: _____

Contact Name: _____

Date Received: _____ Date Reviewed: _____ Reviewer: _____

(SAT = Satisfactory; INC = Incomplete; MIS = Missing; N/A = Not Applicable)

Answers are required for questions which have no N/A box.

I. Purpose and Need for the Action

SAT INC MIS N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|----|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A. | Purpose and need for the project to include what the project entails and why it is being conducted. (It is critical that the project description, and purpose and need are consistent with other discipline reports.) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | B. | Scope of the project and final use of the discipline study. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | C. | Relevant background information on the project along with an identification of entities with vested interests. |

II. Description of Alternatives

SAT INC MIS N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|----|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A. | Succinct description of each alternative being evaluated, including the no-action or no-build alternative. Include the proposed actions to be taken under the alternative, and the site-specific requirements and constraints associated with each action. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | B. | Summary of differences between alternatives (as they relate to surface water resources). |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | C. | Map(s) or figure(s) showing alternatives and project boundaries. |

III. Studies, Coordination, Methods, and Regulations

The purpose of this section is to provide adequate evidence of the background work and resources used to justify the analysis approach taken. This includes a review of rules and regulations and the proposed projects compliance.

SAT INC MIS N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|----|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A. | Summarize Baseline Documentation: |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. | List all potentially affected surface water resources in the project area. |

SAT	INC	MIS	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. List all reports and data sources acquired and contacts made during project development.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Summarize those data sets or reports most pertinent to the project and how they will be used for the analysis and why they were selected.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		B. Identify the rules and regulations that are relevant to the project and how they relate to stormwater and future stormwater conditions:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. WSDOT Plans, Programs, and Policies.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Growth Management Act and Comprehensive land use plans (review GMA restrictions limiting development).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Local basin plans, watershed protection plans, watershed analysis, etc.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Critical areas ordinances.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Wellhead/aquifer protection plans. (Refer to groundwater discipline study.)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Combined sewer outfall reduction plans.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Total Maximum Daily Loads (TMDLs).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Limiting Factors Analysis, Habitat Conservation Plans, 4D rules, or relevant biological assessments.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Local Shoreline Plans and Ordinances.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Shellfish Closure Response Plans.

VI. Project Area Then and Now

This section establishes the natural environment and overlaying built environment from which impacts will be evaluated and compared. The detail and focus should be commensurate with the level of impacts anticipated.

SAT	INC	MIS	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		A. Description of natural framework to surface water quality.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Description of general topography and soils. Geologic setting, slopes, hazardous areas, soil types, soil drainage, waterholding characteristics and erodability. (Refer to geology discipline report, if available).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Description of climate.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		B. Description of Surface Water Resources.

SAT	INC	MIS	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Identify basin, sub-basin, and project boundaries.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Identify WRIA(s).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Summary of available sampling data and assessment of its adequacy.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Stream locations and typing.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Water quality classifications standards and beneficial uses.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. CWA 305 (d) listed waters. Identify the phase of Ecology listing, i.e., is there a TMDL plan in place, under development, or in the implementation phase?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Source identification for existing and/or historical water quality problems (point and nonpoint source pollutants).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Stream channel features (width, depth, riparian vegetation, bank condition, flood storage capacity, off-channel habitat, existing bridges, piers, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Identify existing drainage pathways and wastewater/ stormwater outfall locations. Quantify existing impervious surface.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Identification of water quality factors that are limiting factors to local fisheries.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Surface water hydrologic features (discharge rates, minimum instream flows or other limits).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. Lakes (water quality characterization; sediment toxicity, limiting factors; existing management strategies, restoration efforts, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. Marine waters (tidal and current patterns, flushing rates for estuarine systems, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. Aquatic ESA issues.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15. Description of existing sediment quality and contamination.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16. Antidegradation analysis, as specified in the Antidegradation Policy (40 CFR 131.12).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17. Reference to wetland report and possible summary of key related issues.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18. Reference to groundwater report and possible summary of key related issues.

SAT	INC	MIS	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	19. Reference to floodplain report and possible summary of key related issues.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20. Reference to fisheries report and possible summary of key related issues.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Other issues and constraints.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Describe public and private water supply sources.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Describe project area wastewater removal systems.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Spill data (historical record of major spills, locations, extent, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Wellhead protection areas (in relation to project boundaries) and identified aquifer recharge areas.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Groundwater contamination and remediation actions.

V. Environmental Consequences (formerly called Impacts and Mitigation Sections)

The focus and level of detail for this evaluation should be commensurate with the level of concern. The assessment should consider construction, operational, and indirect impacts from project development. The cumulative environmental effects of the proposed actions, in the context of other actions in the surrounding environments, should be addressed on a watershed basis. A summary statement should be included for all significant impacts.

Comparison of Alternatives

SAT	INC	MIS	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		A. Clearly identify all significant project consequences. Evaluate construction impacts for each alternative, considering:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Erosion and sedimentation potential and predicted impact on water quality and seasonal aspects of the potential affect (e.g., turbidity, suspended solids, nutrients).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Describe all in-water, over-water or near-water work. Describe the Temporary Exceedances of water quality standards and mixing zone limits.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Work near identified sensitive areas (e.g. steep slopes, shoreline, erosion hazard zone, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Availability of short-term water right permits for construction activities in areas subject to low flow conditions restrictions.

SAT	INC	MIS	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Seasonal conditions and impacts on water quality (low dissolved oxygen levels, high temperatures, algae blooms, reduced flows, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Clearing and grading impacts.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Potential impacts associated with project staging areas.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Risks to municipal sewer and water supply lines.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Refer to Groundwater study for potential impact to groundwater quality and sole source aquifers from contaminant sources.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Refer to Hazardous Materials study for information on sediment quality and contamination sources.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Spill potential and spill control response BMPs.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		B. Evaluate operational impacts for each alternative, considering:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Impacts of projected average daily traffic (typical highway runoff pollutants, projected loadings, impacts to receiving water bodies, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Maintenance activity impacts (pesticide application, vector waste disposal, mowing practices, accessibility to maintain BMPs, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Effects of impervious surface additions and alterations to surface hydrology (quantify for ESA requirements).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Seasonal conditions and impacts on water quality (low dissolved oxygen levels, high temperatures, algae blooms, reduced flows, etc.).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Stormwater sediments as a potential contaminant source.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Review and refer to the Fisheries study and impacts on biological organisms, including seasonal closures of shellfish harvest areas and impacts to fish habitat and stream structure.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Potential spillage pathways identified from WSDOT stormwater outfall inventory data (i.e., locations where WSDOT drainage is tightlined to waterbodies, locations where off-site drainage may be tributary to WSDOT systems).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Reference to groundwater, floodplain, fisheries and wetland impacts reports.

Indirect and Cumulative Effects

SAT INC MIS N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | A. Evaluate indirect impacts for each alternative, considering: |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Nonpoint source problems. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Water quantity concerns. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Hydrologic impacts due to long-term streamflow impairment and changes in stormwater quantities. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Changes in land use patterns along transportation corridor. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | B. Evaluate cumulative impacts: |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Evaluate direct impacts on a watershed scale (e.g. pollutant loading and 303(d) listings, impervious surface increases and stormwater runoff, permanent stream crossings, loss of properly functioning riparian zone). |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Evaluate indirect impacts on a watershed scale, especially considering the impacts of future development (e.g. changes in stream flow pattern and morphology and overall pollutant loads from land use pattern change indirectly resulting from the project). |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | C. Include a summary of all impacts identified as significant for each alternative. |

Mitigation

A. Conservation Measures

Conservation measures are required activities or standard practices that are routinely employed on WSDOT projects to avoid or minimize impacts on water quality and quantity. These activities are often incorrectly considered mitigation measures and should be discussed separately.

Some projects are recommended to summarize these required activities in the water quality discipline report, however it is not essential. See Mitigation Measures section of Exhibit 431-2, Technical Guidance, for more information on what qualifies as mitigation and what should be considered required conservation measures.

SAT INC MIS N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Brief description of Highway Runoff Manual or project specific requirements such as Temporary Erosion and Sediment Control and spill prevention measures, groundwater protection, stormwater treatment and maintenance practices. BMPs that may be installed to treat highway runoff should include a caveat that these facilities may change as project design progresses. |
|--------------------------|--------------------------|--------------------------|--------------------------|---|

B. Mitigation Measures

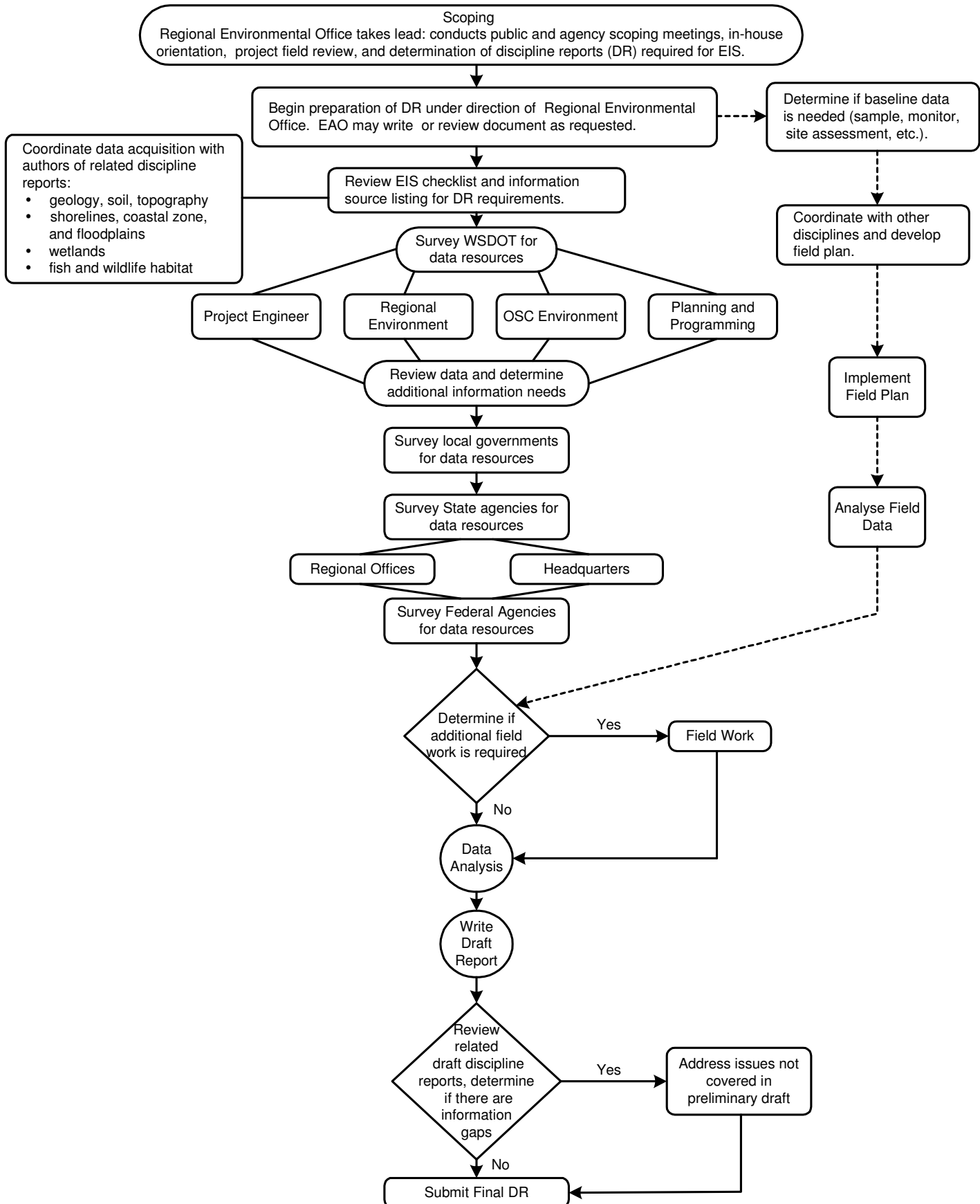
Summarize the activities that reduce the effects that remain despite required conservation measures. Consider measures that avoid, minimize, restore or replace environmental resources. Mitigation measures should be evaluated for site-specific problems and for cumulative impacts related to overall watershed development.

SAT INC MIS N/A

- | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|----|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | A. | Identify mitigation for all significant adverse direct, indirect and cumulative impacts for each alternative. Mitigation strategies include off-site mitigation or restoration options or plans, opportunities for utilizing special/newly researched BMPs, off-site supplemental treatment BMPs, assistance with watershed priorities (set through watershed planning, Low Flow Frequency Analysis, etc.), dovetailing with NPDES research needs, and potential joint projects (such as the 1996 interagency Memorandum of Understanding concerning work in watercourses). |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | B. | Summarize project elements that reduce impacts or the potential for impact from construction activities. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. | Measures to protect water resources above and beyond those required. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. | Protection measures for sewer lines. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. | Potential stormwater BMP retrofit opportunities above and beyond required stormwater treatment. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | C. | Identify means of committing to the mitigation measures and probability of their implementation. |

General Comments: _____

Water Quality Discipline Report Checklist



February 1999

Surface Water Quality Discipline Report Technical Guidance

A Water Quality Discipline Report is prepared during development of a new transportation project, and is intended to provide information required for EAs, EISs, and a variety of water quality permits, certificates, and approvals. The study must be thorough enough to provide data necessary to recognize and assess water quality impacts of a proposed project. Once the need for a Water Quality Discipline Report has been established as described in [Section 431.05](#), the report should be prepared in accordance with this document, and the following other Exhibits:

- Exhibit 431-1: Water Quality Discipline Report Checklist
- Exhibit 431-3: Information Source listing for WSDOT Water Quality Discipline Reports
- Exhibit 431-4: Quantitative Procedures for Water Quality Impact Assessments

The Discipline Report Water Quality Checklist ([Exhibit 431-1](#)) helps ensure that all project-related water issues are adequately considered. The checklist is meant to be fairly comprehensive. Not all of the elements listed in the checklist are required, which is why there is a checkbox for NA (Not Applicable). On the other hand, issues that are not addressed in this checklist may be identified for a project. If issues arise that are not referenced in the list, consult with the Environmental Services Office Water Quality Program staff on how to best address them.

The Information Source Listing for WSDOT Water Quality Discipline Reports ([Exhibit 431-3](#)) provides contact information to help report writers more quickly identify information sources.

The Quantitative Procedures for Water Quality Impact Assessments ([Exhibit 431-4](#)) describes the methodologies for estimating water quality impacts based on WSDOT highway runoff data.

The requirements below are listed by report section headings. The names of some section headings have been changed from previous guidelines to simplify the use of discipline study contents in EIS's that follow the *Reader-Friendly Document Toolkit*. Information on using the toolkit and access to the document are on the Environmental Services Office web site:

 <http://www.wsdot.wa.gov/environment/compliance/ReaderFriendly.htm>.

Some of the features discussed in the Water Quality Discipline Report refer to related discipline reports, and coordination with the authors of related reports is required to evaluate relevant data.

I. Summary of Conclusions

A brief summary of conclusions relating to the water quality effects of the proposed project appears at the beginning of the report. This summary should highlight the water quality issues that need to be presented in the EIS/EA.

II. Purpose and Need for the Action

This section should present the purpose and need for the project. The purpose of the project should include what the project entails and why the project is being conducted. It is critical that the project description, and purpose and need are consistent with other discipline reports. The scope of the project and final use of the discipline study (e.g., as part of a project-specific EIS) should also be presented. Relevant background information on the project should be included, along with an identification of entities with vested interests. If the purpose and need are thoroughly described in another document, it may be best to reference that document to avoid duplication of effort and ensure consistency.

III. Description of Alternatives

This section should include a succinct description of each alternative being evaluated, including the no-action or no-build alternative. The descriptions of the alternatives should include the proposed actions to be taken under the alternative, and the site-specific requirements and constraints associated with each action. A summary description of the major water quality concerns for the project and the general differences between alternatives as they relate to these concerns should also be included.

Detailed information and maps should be obtained from the Project Office. (Since these details can be expected to change over the course of a project, the Project Office should be contacted on a regular basis to verify details.) The project boundaries should be clearly defined and shown on a map(s) of the area encompassed by all of the alternatives, including the no-build alternative.

WSDOT may develop one report that describes the project alternatives and construction methods rather than repeating the description in each technical or discipline report. Reference such documents when they exist and only include discipline-specific information in the discipline report.

IV. Studies, Coordination, Methods, and Regulations

The purpose of this section is to document the process, resources, and tools used to develop the Surface Water Quality Discipline Reports for use in the water quality section of EAs and EISs and build the framework with which impacts can be analyzed. This section should justify the approach taken in the analysis. The level of detail required for the discipline study will vary with the complexity and planning stage of the project. Generally, the process includes: acquiring reports, plans, and data, making contacts with agencies and stakeholders in the project area, reviewing applicable rules and regulations, and summarizing pertinent information.

The information source listing ([Exhibit 431-3](#)) includes resources commonly used to determine the applicability of [Exhibit 431-1](#) checklist items. As the resource listing is not exhaustive, additional sources may also be required. All of the resources and contacts identified during this process should be listed in an appendix to the Discipline Report; while only those directly utilized for the analysis should be cited in the report and included in the References section of the report. This section of the Discipline Report should contain a summary of which reports or data sets were relied upon for the analysis and why they were selected. For example, the analyst could choose to not use water quality data that is more than 20 years old when defining the existing environment. This rationale would be included in this section of the Discipline Report.

The resources and reports identified should be used to obtain data for documenting baseline conditions as well as to summarize major concerns and recommendations related to surface water resources in the project area. This summary of concerns and recommendations may be valuable for identifying possible mitigation opportunities. Applicable rules, regulations, plans and policies should also be summarized in sufficient detail to determine project compliance.

This section must identify the tools or methods used for technical evaluation of water quality data (e.g., hydrological methods and pollutant loading calculations). Since the methods described in [Exhibit 431-4](#) have already been approved for use in Discipline Reports, writers may simply identify the method selected, provide the rationale for selecting that method, and reference the Exhibit. The analyst is not constrained to using the methods in [Exhibit 431-4](#) if more recent, site specific data is available. However, if a quantification method is selected for use that has not already been described in [Exhibit 431-4](#), a detailed description of the method and rationale for its use must be provided.

Discipline studies are based on best available data. In rare cases, however, additional baseline data may be required to document current water quality conditions. Determine early in the project scoping process whether additional data collection activities may be required and notify the Project Office of budget and scheduling revision requirements. Consult with the Environmental Services Office prior to making any commitments to collect baseline data, as

monitoring and quality assurance plans would be required. These efforts should also be coordinated with other disciplines.

If the project is complex or controversial, take steps to obtain informal approval for the analysis approach from the Project Office. If necessary, prepare a technical memo for submittal to the Project Office that describes the list of studies and reports that are to be relied upon for the analysis and a description of the quantification or estimation methods that will be used. The Project Office may choose to send this memo to permitting agencies and other interested parties for comment.

V. Project Area Then and Now (*formerly called Affected Environment*)

The primary function of this section is to describe the framework against which the effects of the project can be compared. Generally, this framework is easier to write and understand if the analyst first describes the natural environment and then overlays the existing built environment. Consequently, discipline reports typically begin with descriptions of soils, topography, geology, and natural watershed and stream characteristics and sensitive areas or issues associated with them. The description of the existing built environment then should superimpose land use patterns, features associated with land use (e.g., stormwater outfalls, instream structures, impervious area, stream hydrology and morphology changes) and how they influence the natural framework.

There are two issues to consider when developing both the Project Area Then and Now and Environmental Consequences sections: the focus of the analysis and amount of detail required. A soil scientist's description of site soils might include information on plasticity, compressability, pore strength, color, and organic content as well as information on slope, drainage capacity and potential to erode. However, in terms of water quality impacts, it is slope, drainage, and erosion that are important and these characteristics should be the focus of the descriptions. Information provided outside of this focus will simply add to the length of the report without enhancing its value. The level of detail should be correlated to the importance of the item to the project or project area. For example, the description of soils and topography might simply be a few sentences describing a "flat to rolling topography with well-drained loamy soils". Or, if there are steep slopes coupled with poorly drained soils that cause special concerns related to erosion or site drainage problems, then more detail and explanation and possibly a map showing problem areas is warranted. The level of detail required also changes with respect to the project phase. If it is the first phase in planning for a regional road network then most of the checklist items will be addressed with a broad brush when compared to the assessment detail required for comparison of specific road alignment and design alternatives.

By nature the Water Quality Discipline Report will be linked to the Groundwater, Floodplains, Wetlands, and Fisheries Discipline Reports. The Water Quality Discipline Report should be written to minimize redundancy while also insuring that there are no conflicts with the other reports. This requires coordination with authors of the other discipline reports and inclusion of references to those reports. For example, in a project where a stream side channel would be lost as a result of project construction, the water quality impact discussion might focus on increased flooding and changes in stream channel characteristics. Impacts to fisheries can be limited to a statement such as: "The potential impacts of side-channel loss on Coho is evaluated in the Fisheries Discipline Report (WSDOT, 2003b)."

VI. Environmental Consequences (*formerly called Impacts and Mitigation*)

A. Comparison of Alternatives

As described in the Project Area Then and Now section, the focus and level of detail provided should reflect the level of concern associated with the issue. Typically the evaluation of consequences for the first alternative is detailed. It contains information on why the issue is important, how it might affect water quality, and how it was evaluated. For example, in terms of clearing and grading, it would describe the direct relationship between the number of

acres that are cleared and graded and the potential for impact to surface water quality. This information might be further refined to identify those cleared and graded acres that are within 100 feet of surface water, or near steep slopes. The effects associated with remaining alternatives can then be evaluated by comparing them to the first alternative, without reiterating the background information about why the issue is important. This minimizes redundancy and clarifies the comparison between alternatives. Typically short term consequences (those that occur or have the potential to occur during project construction) are addressed separately from long-term effects, for each of the project alternatives.

It is critical to clearly identify all significant project consequences. It is not appropriate to provide a paragraph of text describing the potential for effect and how it will be avoided without providing the reader with a final statement about its significance. A table, graph or list that contains all the potential consequences and their final evaluation result (i.e., significant, insignificant, discountable, minimal), or a one sentence summary statement are typical means of insuring the final effects have been identified.

B. Indirect and Cumulative Effects

Indirect and Cumulative Effects must also be addressed in this section. The following definitions should be used as a guide to defining these:

- **Indirect Effects** are caused by the proposed project, but occur later in time and are further removed in distance than Direct Effects. An indirect effect of increased stormwater runoff that is directly attributable to the increased impervious surface associated with a project, would be the eventual changes in stream channel morphology as caused by the change in flow pattern.
- **Cumulative Effects** are direct or indirect effects that result from incremental impacts of the proposed project when added to the other past, present, and foreseeable future actions. These effects can result from individually minor but collectively significant actions taking place over a period of time. The cumulative environmental effects of the proposed actions associated with each alternative should be addressed on a watershed basis in the context of other actions in the surrounding environment. To use the example above, even if the increase in stormwater runoff was considered to be undetectable or insignificant, the project would still contribute to the cumulative effects associated with increased impervious surface in the basin.

Two important factors to consider in determining the potential for Cumulative Effects are: the potential for future development and the type of project. In areas experiencing little growth, an individual highway project will contribute negligibly to Cumulative Effects because of the absence of other development activity. Conversely, in areas of rapid development, a highway improvement can add measurably to aggregated change leading to long-term effects. Capacity improvements, additional interchanges, and construction in a new location generally have greater potential for Cumulative Effects than upgrades of existing facilities.

C. Mitigation Measures

Mitigation measures must be identified for all adverse effects (both significant and non-significant). The analyst should use the following “mitigation sequence” recommended by FHWA when considering mitigation options. The sequence is: avoid → minimize → repair or restore → reduce over time → replace.

The analyst is expected to use professional knowledge and expertise to demonstrate mitigation strategies that are based on solving project-specific impacts. Not all project effects can be fully mitigated. If no mitigation options have been identified for a specific effect, this should be stated. All relevant, reasonable mitigation measures that could improve the project should be identified, even if they are outside the jurisdiction of WSDOT. The probability of successfully implementing a mitigation measure should also be addressed in an EIS to ensure that project effects are fairly assessed.

There is often confusion over what constitutes a true mitigation measure. For example, it is tempting to describe stormwater treatment facilities as a project mitigation measure for reducing stormwater impacts. Yet these facilities are not optional; they are a required part of the project design, not mitigation measures. In order to make this distinction clear, it can be an advantage to begin the mitigation discussion with a summary of “conservation measures” included in the project design to avoid and minimize project effects. This could easily segue into a simple summary or bulleted list of the effects that remain despite the conservation measures.

General Guidance to Avoid Common Problems

Discipline report writers should be aware that:

- All WSDOT projects are required to employ an appropriate combination of approved Best Management Practices (BMPs) in accordance with WSDOT’s *Highway Runoff Manual* (M31-16, March 2004) as part of their design.
- The BMPs in the *Highway Runoff Manual* constitute All Known and Reasonable Treatment (AKART) and are presumed to effectively treat runoff to meet water quality standards.
- The appropriate combination of BMPs can only be selected after adequate design information has been developed.
- The effectiveness of approved BMPs along with the maintenance needs are evaluated on a programmatic, statewide basis.
- The BMP maintenance activities are established on a programmatic basis.

It is inappropriate for Discipline Reports, which are informational documents, to include statements that could later be interpreted as design, research, or maintenance commitments. The policies governing those activities are set on a programmatic level in accordance with appropriate permits and resources. As such, statements of the following nature that have been included in past Water Quality Discipline Studies must be avoided:

- Suggestions to evaluate the effectiveness of approved BMPs as mitigation measures.
- Suggestions to monitor the receiving waters as a mitigation measure.
- Stating the type, number or location of BMPs that will be employed.
- Suggestions to use alternative, experimental stormwater treatment approaches.
- Setting of specific maintenance frequencies or methods.

Statements concerning stormwater facilities should primarily reference the programs or guidance documents that establish the criteria for designing and maintaining stormwater facilities and not attempt to describe facilities in detail. This approach helps maintain consistency and accurate expectations, especially when unpredictable changes in treatment facility design or policies related to stormwater are likely.

Information Source Listing for WSDOT Water Quality Discipline Reports

Overview

The following is a source listing for information used to develop a Water Quality Discipline Report. The listing is organized by the following subject categories (column one): water quality, water quantity, aquatic biology, coastal environments, resource management, soils/geology, groundwater, hazardous waste/spill data, wetland, land use management, or land use/topography. Column two identifies the type of information that can be obtained for each subject category (i.e., maps, aerial photos, databases, digital geographic data (GIS), reports, or information contact). Column three identifies the name of the entity providing the information, and column four lists a contact number for the source, if available.

Additional References

The information listing provides a general overview of available data sources, and should not be considered inclusive of all resources potentially available for a major project. Discipline reports prepared for related areas of environmental impact should be reviewed to reduce duplication of data gathering and to ensure water quality issues are adequately addressed for project conditions.

Universities, colleges, and tribal environmental departments are also excellent sources of environmental data. Several sources included in this listing were obtained from a document entitled, *Guidance for Conducting Water Quality Assessments and Watershed Characterizations Under the Nonpoint Rule (Chapter 400-12 WAC)*, published by Washington State Department of Ecology (Publication No. 95-307, February 1995), available from Ecology's Publications Distributions Office 360-407-7472. Ecology's publication contains a more detailed description of several of these data sources, as well as additional information on water quality assessment methods.

SUBJECT	MATERIAL TYPE	SOURCE	CONTACT
Water Quality	Contact	local sewer & water districts	Consult local directory
Water Quality	Contact	local health departments	Consult local directory
Water Quality	Contact	DOH (shellfish, bacterial & red tide data)	Shellfish Programs 360-236-3330
Water Quality	Contact	WDFW (Water Quality impact on fisheries)	Habitat Division 360-902-2534
Water Quality	Contact	PSWQA (ambient monitoring information)	360-725-5444
Water Quality	Contact	Conservation Districts	Consult local directory
Water Quality	Contact	local public works departments (stormwater)	Consult local directory
Water Quality	Contact	WSDOT	Headquarters Water Quality 360-570-6648 or 360-570-6649
Water Quality	WSDOT Highway Runoff Manual	WSDOT	Stormwater Environmental Services 360-570-6657 (Pub. No. M31-16)
Water Quality	Statewide Water Quality Assessment 305(b)	Ecology	Water Quality 360-407-6782 or 509-329-3590
Water Quality	Report: 303(d) List1 (1994). 1995 available Fall '95.	Ecology	Water Quality 360-407-6782 or 509-329-3590
Water Quality	Water Quality Modeling	Ecology	360-407-6485
Water Quality	Drinking water data system	EPA	Water Hotline: 800-426-4791
Water Quantity	Contact & database info for basin characteristics, peak flows, water quality data, etc.	USGS	Consult local directory
Water Quantity	Contact	Ecology	306-407-6557
Water Quantity	Contact	Local public works departments (stormwater & flood control)	Consult local directory
Water Quantity	Contact	Utility districts	Consult local directory
Water Quantity	Contact	Drainage and Irrigation Districts	Consult local directory
Water Quantity	Basin Plans, Drainage Manuals, Comprehensive Drainage Plans	Local public works departments (stormwater & flood control)	Consult local directory

SUBJECT	MATERIAL TYPE	SOURCE	CONTACT
Resource Management	Contact: permit assistance, site searches, identify key contacts at govt. agencies	Ecology	Permit Assistance Center 360-407-7037 or 800-917-0043
Soils/Geology	Contact	Local Developers (soil percolation tests)	Consult local directory
Soils/Geology	Maps: Slope stability maps	DNR	Geology/Earth Resources 306-902-1450
Soils/Geology	Report: Local Geology	DNR	Geology/Earth Resources 360-902-1450
Soils/Geology	Report: Soils Surveys	Conservation Districts & USDA NRCS	Consult local directory
Groundwater	Report: WA State Wellhead Protection Program	DOH	Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom Counties 253-395-6768 Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum Counties 360-753-5953 Adams, Asotin, Benton, Chelan, Columbia, Douglas, Franklin, Ferry, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Orielle, Spokane, Stevens, Walla Walla, Whitman, and Yakima Counties - Reclaimed Water Issues 509-456-2457
Groundwater	Contact	USGS	Water Resources Division 253-428-3600 x2653
Groundwater	Contact	Ecology	Water Quality 360-407-6635
Groundwater	Contact	Local health departments, city & county planning/environmental departments	Consult local directory
Hazardous Waste/Spill Data	Contact	Ecology, & NOAA Hazardous Material Branch (for marine environment)	Ecology Spill Mgt 360-407-7450 NOAA Hazmat 206-526-6317
Hazardous Waste/Spill Data	Contact	WSDOT (highway spill/accident reports)	360-705-7851
Hazardous Waste/Spill Data	Contaminated soils maps and underground storage tank locations	WSDOT	360-570-6658
Wetland	Contact	Ecology (wetland inventories)	360-407-7274

SUBJECT	MATERIAL TYPE	SOURCE	CONTACT
Wetland	Contact	Corps (Section 10 & 404 Permits, water bodies dredge & disposal permit info.)	General Info 206-764-3742
Wetland	Contact	City and county planning & zoning departments	Consult local directory
Land Use Management	FEMA Maps	Local planning departments	Consult local directory
Land Use Management	Contact	County assessor/planning/or environmental health offices	Consult local directory
Land Use Management	Report/maps: Comprehensive Land Use Plans	City and county planning & zoning departments	Consult local directory
Land Use Management	Contact	Conservation Districts	Consult local directory
Land Use Management	Contact	Puget Sound Regional Council of Governments	206-464-7090
Land Use/ Topography	Aerial photographs	WSDOT	Geographic Services 360-709-5515
Land Use/ Topography	Aerial photographs: Historical photos, 1950's	USDA, ASCS	Aerial Photography Field Office - Sales Branch 801-975-3503
Land Use/ Topography	Aerial photographs: Puget Sound Waterways & Columbia Basin	Corps, Seattle District Office, Survey Branch 206-764-3552	General Info 206-764-3742
Land Use/ Topography	Satellite Imagery (Landsat Data)	EOSAT	301-552-0537 or 800-232-9037

ACRONYMS

Corps	U.S. Army Corps of Engineers	DOH	WA Department of Health
Ecology	WA State Dept. of Ecology	EAP	Environmental Assessment Program
EOSAT	Earth Observation Satellite Company	EPA	U.S. Environmental Protection Agency
FWS	U.S. Dept. of Interior, Fish and Wildlife Service	NRCS	Natural Resources Conservation Service
NOAA	National Oceanic and Atmospheric Administration	PSWQA	Puget Sound Water Quality Authority
USDA	U.S. Dept. of Agriculture	USGS	U.S. Dept. of Interior, Geological Survey
WDFW	WA State Dept. of Fish and Wildlife	WDNR	WA Dept. of Natural Resources

Please forward any corrections or updates to: Richard Tveten, WSDOT Environmental Affairs Office, Water Quality Team at Tvetenr@wsdot.wa.gov

Quantitative Procedures for Water Quality Impact Assessments

Pollutant Loading Estimates

Annual load is calculated when preparing Discipline Reports to assess the impacts of a project. Two methods are described and summarized below that are appropriate for use in the early planning stage of a project or to compare between project alternatives. The methods were selected because they are: (1) based on recent WSDOT highway runoff data, (2) easy to apply or (3) specific to the Pacific Northwest.

Method 1: WSDOT Data-FHWA method.

This method estimates pollutant loads based on highway runoff data collected in western Washington since 2001 (Table 3). Because the data is recent and specific to WSDOT highways, it provides the most accurate estimate of pollutant concentrations flowing from both treated and untreated highway surfaces. The data is representative of runoff from high average daily traffic (ADT) volume highways (90,000-160,000) in western Washington. WSDOT doesn't have sufficient data to estimate annual loads for lower ADT highways across the rest of the state at this time. One can, however, use the high ADT loading rates for lower ADT highways with the understanding that the data represents a worst-case scenario.

The FHWA method and data collected for WSDOT's 2004 Annual NPDES Report were used to generate the annual pollutant loading estimates in Table 3. To use this method, first create a table with the number of acres of highway surface that currently exist and the number of acres of highway surface for each proposed alternative (see Table 4 below). Include the number of acres that will be treated and those that will remain untreated, if applicable, for each alternative. Multiply the acres of treated and untreated surface by the annual pollutant load values, using the means or ranges in Table 3. Add the pollutant loads from the untreated and treated surfaces for each alternative (including no-build or existing conditions) to generate a total pollutant load in pounds per year. Data from the completed table can be directly inserted into discipline studies to compare impacts associated with each alternative.

Table 3: Annual pollutant loads from untreated and treated highway surfaces in lbs/acre

Pollutant	Mean load from Untreated surfaces	Mean load from treated surfaces based on mean BMP effectiveness
Total Suspended Solids	878 (range 350-2000)	41 (range 40-42)
Total Phosphorus	1.3 (range 0.6-2.9)	0.3 (range 0.26-0.32)
Total Copper	0.2 (range 0.1-0.3)	0.05 (range 0.045-0.055)
Total Zinc	1.1 (range 0.5-1.8)	0.26 (range 0.23-.29)

Table 4: Example table for estimating annual pollutant loads using *Method 1*.

	No-build	Alternative 1	Alternative 2
Roadway Treated (acres)	0	7	12
Roadway Untreated (acres)	20	15	13
Total Roadway (acres)	20	22	25
Annual load of total suspended solids	17,560 lbs/yr	13,454 lbs/yr	11,902 lbs/yr
Annual load of total phosphorus	26.2 lbs/yr	21.6 lbs/yr	20.5 lbs/yr
Annual load of total copper	4 lbs/yr	3.3 lbs/yr	3.1 lbs/yr
Annual load of total zinc	22.4 lbs/yr	18.6 lbs/yr	17.4 lbs/yr

If multiple drainage basins will be affected by stormwater from the proposed project alternatives, modify Table 4 or provide additional tables showing how many acres will be impacted in each basin by each alternative. Once the acreages are known for each basin, repeat the above instructions to quantify the affects of each alternative on each basin in addition to the overall project total.

One disadvantage of *Method 1* is that it doesn't take into account the changes in pollutant loads due to the conversions of previously developed lands. Some land conversions, like replacing commercial land with highways, can result in a net reduction in stormwater pollutants. Accordingly, *Method 1* should be limited to projects that don't include significant conversions of previously developed lands to highways.

Method 2: Application of Literature Values.

The second method uses data, largely collected in the Pacific Northwest in the 1980's, from a variety of land uses to generate pollutant loading estimates (Horner 1992). Table 5 summarizes the range of pollutant yields measured from varying land uses. This method is a very general estimating method and should be noted as such in the methods and discussion sections of a Discipline Report.

An advantage of this method is the ability to capture changes in pollutant loads associated with the conversion of developed areas, like commercial or residential lands into highways. Disadvantages associated with this method are: (1) the data is over 12 years old, and (2) the "road" pollutant estimates are based on a variety of road types and not exclusively on highways. Because the data does not accurately represent highway runoff, use *Method 1* to calculate the loads from treated and untreated highways. The values for "road" in Table 5 estimate the pollutant loading of other roadways (county or city streets, etc.) and should be used to estimate pollutant loads for a project that will convert other roadways (county or city streets, etc.) into WSDOT highway to characterize the change in pollutant loading between the two types of roadway.

Table 5: Annual Pollutant Loading Rates by Land Use

Land Use	Yield Estimate Basis ¹	Total Suspended Solids	Total Phosphorus	Total Nitrogen	Lead ²	Zinc	Copper	Fecal Coliform Bacteria	Chemical Oxygen Demand
Road ³	Minimum	250.28	0.53	1.16	0.44	0.16	0.03	2.87E+07	99.76
	Maximum	643.97	1.34	3.12	0.98	0.40	0.08	1.13E+08	257.41
	Median	447.13	0.98	2.14	0.69	0.28	0.05	7.29E+07	179.03
Commercial	Minimum	215.55	0.61	1.43	1.43	1.51	0.98	6.88E+08	272.55
	Maximum	1219.35	0.81	7.84	4.19	4.36	2.85	3.85E+09	1539.11
	Median	717.00	0.71	4.63	2.76	2.94	1.87	2.27E+09	905.83
Single Family Low Density	Minimum	53.44	0.41	2.94	0.03	0.06	0.08	1.13E+09	NA
	Maximum	302.83	0.57	4.19	0.08	0.18	0.24	6.48E+09	NA
	Median	178.14	0.49	3.56	0.05	0.12	0.16	3.77E+09	NA
Single Family High Density	Minimum	86.40	0.48	3.56	0.04	0.10	0.13	1.82E+09	NA
	Maximum	487.21	0.68	4.99	0.13	0.29	0.40	1.05E+10	NA
	Median	286.80	0.58	5.17	0.09	0.20	0.27	6.07E+09	NA
Multifamily Residential	Minimum	118.46	0.53	4.19	0.31	0.15	0.15	2.55E+09	89.07
	Maximum	672.47	0.72	5.88	0.94	0.45	0.30	1.46E+10	504.13
	Median	395.47	0.62	4.99	0.62	0.30	0.45	8.50E+09	296.60
Forest	Minimum	23.16	0.09	0.98	0.01	0.01	0.02	4.86E+08	NA
	Maximum	130.04	0.12	2.49	0.03	0.03	0.03	2.75E+09	NA
	Median	76.60	0.10	1.78	0.02	0.02	0.03	1.62E+09	NA
Grass	Minimum	71.26	0.01	1.07	0.03	0.02	0.02	1.94E+09	NA
	Maximum	523.72	0.22	6.32	0.09	0.15	0.04	1.09E+10	NA
	Median	308.18	0.12	3.74	0.06	0.09	0.03	6.48E+09	NA
Pasture	Minimum	91.74	0.01	1.07	0.00	0.02	0.02	1.94E+09	NA
	Maximum	519.27	0.22	6.32	0.01	0.15	0.04	1.09E+10	NA
	Median	305.51	0.12	3.74	0.01	0.09	0.03	6.48E+09	NA

NA = Not Available.

¹ All units are in lb/acre/yr except fecal coliform bacteria which are in number/acre/yr. These values were converted from kilograms/hectare/year in Horton's original table.

² Leaded fuels are no longer used and lead concentrations in runoff have greatly decreased since the time of this study. As such, there is no need to analyze highway projects for lead unless soils are contaminated.

³ Values in gray estimate the pollutant loading of other roadways (county or city street, etc.). These values should only be used when non-highway roads are being converted into highway. To calculate WSDOT highway pollutant loading use values from Table 3.

Reference: Horner 1992.

This method is straightforward to apply. Estimate the number of acres of land that will be contributing to the point of interest (e.g., a stormwater facility or receiving water) and multiply the area by the values in Table 5 for the pollutants of interest.

For example, the calculation for the median annual load of total suspended solids (TSS) from an untreated 10 acre commercial lot is as follows:

- Median annual TSS Load = (717.00 lb/acre/yr)(10) = 7,170 pounds/year.

Repeat the above calculation for each area subject to applicable land uses in Table 5 other than highways. Use **Method 1** for treated and untreated highway surfaces. Add the annual loads for each land use area to produce total loads for each alternative.

Table 6: Example table for developing annual pollutant loads for comparison of project alternatives

	No-build	Alternative 1	Alternative 2	Alternative 3
Roadway untreated (acres)	50	100	0	50
Roadway treated (acres)	0	0	100	20
Multi-family residential (acre) Note: Median value used	25	0	0	5
Commercial (acres) Note: Median value used	25	0	0	25
Total project area	100	100	100	100
Annual load of total suspended solids	112,970 lbs/yr	87,800 lbs/yr	4,100 lbs/yr	89,460 lbs/yr
Annual load of total phosphorus	103 lbs/yr	130 lbs/yr	30 lbs/yr	77 lbs/yr
Annual load of total copper	75 lbs/yr	20 lbs/yr	5 lbs/yr	76 lbs/yr
Annual load of total zinc	146 lbs/yr	110 lbs/yr	26 lbs/yr	139 lbs/yr

If multiple drainage basins will be affected by stormwater from the proposed project alternatives, modify Table 6 or provide additional tables showing how many acres will be impacted in each basin by each alternative. Once the acreages are known for each basin, repeat the above instructions to quantify the affects of each alternative on each basin in addition to the overall project total.

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